



**Draft Proposal to Reduce Emissions from  
Ship Auxiliary Engines**

**Evening Public Meeting**

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August 24, 2005**




**California is Major Gateway  
to Global Trade**




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## Emissions from Maritime Operations

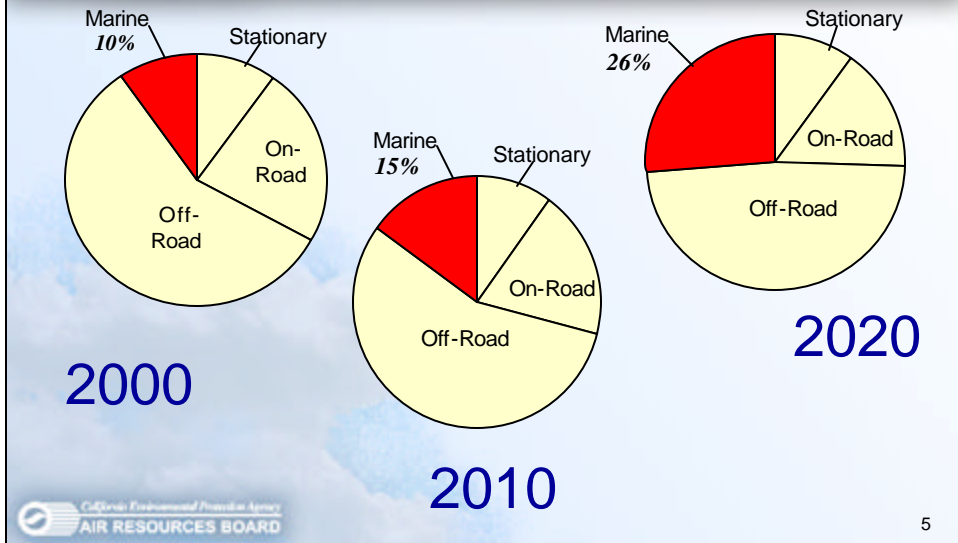
- On-Road Heavy-Duty Diesel Trucks
- Land-based cargo handling and support equipment
- Ships and Harbor Craft
- Locomotives



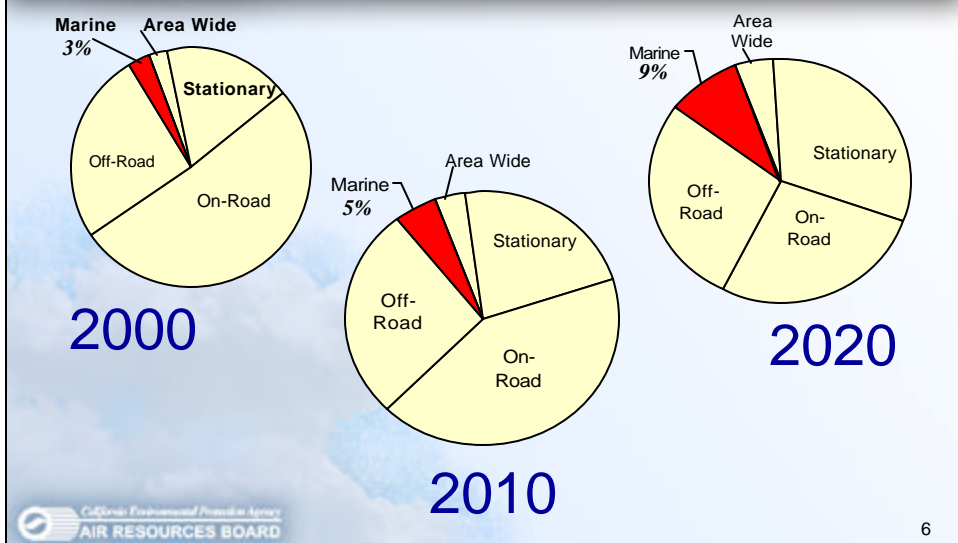
## Future Trends

- Dramatic increase in trade
- More goods movement emissions overall
- Localized impact on nearby communities

## Commercial Marine Vessel Contribution to Statewide Diesel PM Emissions



## Commercial Marine Vessel Contribution to Statewide NOx Emissions



## ARB Framework for Continuing Improvement

- Diesel Risk Reduction Plan
  - Adopted 2000
  - Overall goal is to reduce emissions 85% by 2020
- State Implementation Plan
  - Blueprint for meeting federal air quality standards
- Governor's Environmental Action Plan
  - Reduce emissions by 50% by 2010

## Strategy for Ocean-Going Ships

- International & Federal New Engine Standards
  - United States needs to ratify Annex VI
  - States, USEPA pushing IMO for more stringent standards
  - USEPA committed to more stringent standards for US flagged ships in 2007
- In-Use Strategies
  - ARB rule for cleaner fuels in auxiliary engines (4th Q2005)
  - Additional requirements for frequent visitors (2006)
  - Sulfur Emission Control Area designation
  - Cold-ironing feasibility study
  - Ship water emulsion demonstration



## Ship Auxiliary Engine Emission Reductions Are Important

- Component of SIP Measure for In-use Ship Emissions
- Emissions during hotelling close to shore (PM reductions critical)
- Fewer technical obstacles (4 stroke engines)

## Summary of Draft Auxiliary Engine Proposal

- Requires use of cleaner marine distillate fuel
  - 7/1/06: MGO (or MDO with 0.5% sulfur limit)
  - 1/1/2010: MGO with 0.1% sulfur limit
- Applies to ships inside 24 nm Contiguous Zone

## Proposed Sea Boundary\*



## Proposed Cleaner Fuel Provisions

- On July 1, 2006 require the use of MGO (or MDO with a 0.5% sulfur limit)
  - ARB Ship Survey indicates average marine distillate is 0.5% sulfur
  - Maintains most of the emission reductions of previous 0.2% S limit
  - 0.2% S fuel not available at all ports



## Proposed Cleaner Fuel Provisions (Continued)

- On January 1, 2010 require the use of MGO with a 0.1% sulfur limit
  - unchanged from last draft proposal
  - consistent with current EU proposal
  - subject to feasibility review of availability, cost, and technical considerations by July 1, 2008

## Concept for Discussion: Mitigation Fee Provision

- Pay fee (to be determined) in lieu of compliance for up to 3 ship visits
- Option limited to special situations:
  - Unexpected redirection to CA port
  - Complying fuel/barge unavailable
  - Fuel found to be noncompliant at sea
  - One time visitor requires ship retrofits

## Alternative Compliance Plan

- Allows a company to achieve equivalent or greater emission reductions to the regulation through alternative means such as shore-side power or retrofits
- Company must submit an application demonstrating emission reduction benefits and safeguards ensuring ongoing compliance
- Provides flexibility to companies to achieve emission reductions more cost-effectively

## ACP Provisions on the Use of Shore-side Power

- For port visits where shore-side power is utilized, travel to and from the port (as well as dockside operation) will be considered to meet the emission reduction requirements of the ACP
- Travel to subsequent CA ports where shore-side power is not utilized will require use of cleaner fuels



## How ACP Shore-Side Power Provision Applies to a Ship Visiting Two CA Ports



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## Estimated Auxiliary Engine Emissions and Reductions

Pollutant Type	California Emissions (TPD)	Emissions Regulated Zone (TPD)	Emission Reduction (TPD)
NOx	40	33	1.5
PM	3.6	3	2.0 (2.2 in '10)
SOx	30	25	16 (20 in '10)

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## Total Estimated Cost and Cost-Effectiveness of Proposal

- Recurring annual cost (fuel): 35 million (39 million starting in 2010)
- Capital (retrofit) cost: 20 million
- Cost-Effectiveness: \$55k/ton PM reduced (53k starting in 2010)

## Estimated Cost to a Typical Ship Operator

- Varies widely with number of ships and CA port visits. Regulation costs are relatively minor compared to ship operating costs
- Average annual recurring (fuel) cost: \$25,000 per company (\$28,000 starting in 2010)
- Greater fuel costs for diesel electric vessels. (e.g. typical cruise ship visit is ~\$20k versus 5k for typical container ship visit annually).
- Capital (retrofit) cost: Highly variable. None for most (\$100,000 per vessel requiring retrofits)

## ARB Staff Contacts and Web-site Information

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